

38. (amended) A composite article comprising aerogel and a reinforcing structure to serve as a flexible, durable, light-weight insulation product wherein the reinforcing structure comprises (i) a lofty fibrous batting which causes no substantial degradation of the thermal performance of the aerogel as compared with a non-reinforced aerogel body of the same material, [and] (ii) one or more high thermal conductivity materials having a thermal conductivity of equal to or greater than 1 W/m-k, and (iii) the aerogel is not formed by a joining together of aerogel particles or granules in a binder.

R E M A R K S

By the above amendments the independent claims of the application, i.e. 1, 12, 19 and 38 have each been amended to specify that the aerogel of the present invention is a monolith formed in situ and not a collection of previously prepared aerogel particles or granules joined together by a binder.

Also Claims 10, 34 and 36 have been amended in response to the claim objections and 35 USC 112 rejections discussed further below.

Referring to the paragraph numbers of the Office Action:

1. Claim 10 has been amended to delete the duplicate words "less than" and thus the claim objection is deemed overcome

2-4. Claims 34 and 36 were rejected under 35 USC 112 second paragraph for being indefinite. The claims have been amended to clarify that the limitations of a heat sink and a device which converts the thermal energy to electrical energy are intended to be within the scope of the claims and not merely for intended use. Thus the rejection is deemed overcome.

5-6. Claims 1-4, 7-8, 11, 19, 25-28, 31-32, 37-39, 42-43, and 48 were rejected

under 35 USC 102(e) as being anticipated by Frank et al (US 2003/0077438).

This rejection is most strenuously traversed in view of the amendments to the independent claims which explicitly differentiate the present invention from Frank et al.

The material described and now more specifically claimed in the present application is an aerogel monolith reinforced with fibrous material. An aerogel monolith is a uniformly structured block of material. Thus the aerogel composites of this invention contain a lofty fibrous batting completely filled with an aerogel monolith. And as shown in the Examples, the resulting structures can be sufficiently pliable to survive repeated flexure cycles wherein the product can be doubled over upon itself multiple times without loss of thermal performance.

Frank et al, on the other hand, teaches a product produced by combining 5 to 97% aerogel particles, with at least one binder material, and at least one fibre material. (0001 and elsewhere). The reason that Frank et al utilizes a conventional aerogel particle forming process is even explained by Frank et al in paragraph 0005:

(0005) The process that shapes the aerogel is concluded during the sol-gel transition. Once the solid gel structure has been formed, the external shape can only be changed by size reduction, for example, by pulverizing. The material is too brittle for any other form of stress.

To the contrary, Applicants have discovered that by the use of a lofty fibrous batting they are able to produce a flexible product with excellent insulation performance characteristics. Clearly, doing what the prior art teaches as being impossible is the essence of a patentable invention.

The fact that there are some common characteristics between the ingredients utilized to produce the presently claimed structures and those of the prior art are not

relevant in view of the totally different result. Thus further comment about specific dependent claims is not believed necessary except for Claim 27.

Claim 27 reads:

The composite of Claim 19, wherein a material having a high thermal conductivity equal to or greater than 1 W/m-k is added on the x-y axis of the composite structure in addition to the lofty batting.

The assertion is that Frank et al teaches a material of high thermal conductivity when it uses a covering layer having a thermal conductivity of 10-100 mW/mK (0053), but this is totally incorrect. The thermal conductivity required in Claim 27 is equal to or greater than 1 Watt/meter-degree Kelvin which is equal to 1000 milliwatts/meter-degree Kelvin.

Accordingly, no rejection of the present invention based upon Frank et al can stand and withdrawal of the rejection of Claims 1-4, 7-8, 11, 19, 25-28, 31-32, 37-39, 42-43, and 48 is requested.

7-8. Claims 5, 20-24, 33-36, 40-41, 44, and 45-47 were rejected under 35 USC 102(e) as being anticipated or, in the alternative, under 35 USC 103(a) as obvious over Frank et al (US 2003/0077438).

These rejections fall for the same reasoning as the prior one in that Frank et al teaches that the present invention is impossible. Clearly since Frank et al explicitly teach that a flexible product as produced by the present invention cannot be produced other than by forming aerogel particulates and then "glueing" them together, it cannot possibly disclose the present invention nor make it obvious to one of ordinary skill in the art or aerogels.

Accordingly, no further comment is believed warranted. Withdrawal of the rejection is requested.

9-10. Finally, Claims 6, 9-10, 12-18, 29 and 30 were rejected under 35 USC 103(a) as being unpatentable over Frank et al (US 2003/0077438).

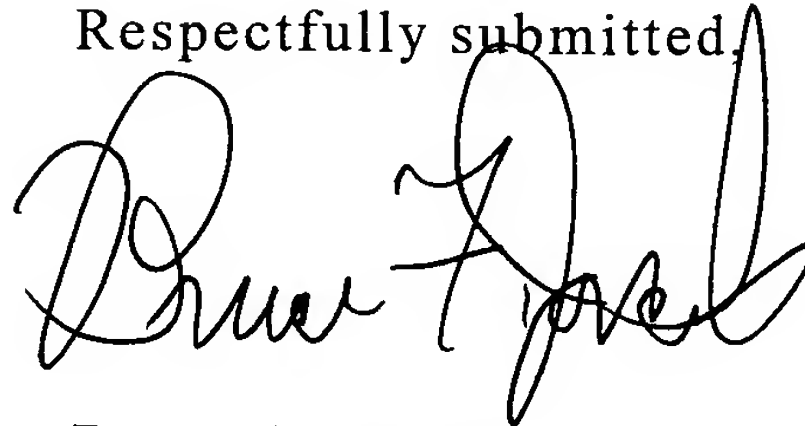
These rejections fall for the same reasoning as the prior ones in that Frank et al teaches that the present invention is impossible. Clearly since Frank et al explicitly teach that a flexible product as produced by the present invention cannot be produced other than by forming aerogel particulates and then "glueing" them together, it cannot possibly suggest controlling the lofty fibrous batting to be able to make the claimed products. Any assertion that Frank et al discloses a lofty fibrous batting within the scope of the present invention is clearly dispelled by Frank et al's teaching that the results obtained by Applicants are impossible. The impossible would not be obvious to one of ordinary skill in the art or aerogels.

Accordingly, no further comment is believed warranted. Withdrawal of this rejection is requested.

Summary:

In view of the above amendments and arguments, an early notice of allowance is requested for claims 1-48.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Bruce F. Jacobs", written in a cursive style.

Bruce F. Jacobs

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BFJ/cm